FACULTY OF LAW, ECONOMICS AND FINANCE

Department of Economics and Managment

Discussion Paper

2020-08

Economics

Department of Economics and Management
University of Luxembourg

Fiscal effects of migrants in Europe: a quantile regression Approach

available online : https://wwwfr.uni.lu/recherche/fdef/dem/publications/discussion_papers

Majlinda Joxhe, Department of Economics and Management, Université du Luxembourg, L
Pasquale Scaramozzino, University of Rome Tor Vergata, I
Skerdilajda Zanaj, Department of Economics and Management, Université du Luxembourg, L

February, 2020

For editorial correspondence, please contact: dem@uni.lu
University of Luxembourg
Faculty of Law, Economics and Finance
6, Rue Richard Coudenhove-Kalergi
L-1359 Luxembourg

Fiscal effects of migrants in Europe: a quantile regression approach

Majlinda JOXHE*, Pasquale SCARAMOZZINO †, Skerdilajda ZANAJ‡

February 25, 2020

Abstract

In this paper, we explore the fiscal impact of immigrants in Europe applying a quantile regression approach to data from the European Survey on Living Conditions (EU-SILC) for the period 2007-2015. Our estimations show that not only on average but also in almost all income quantiles, the fiscal position of both European and non-European migrants is not significantly different from that of native citizens. Furthermore, non-EU migrants are net contributors as compared to the corresponding native citizens in the Netherlands and Belgium for various quantiles.

Lastly, we examine the link between migrants' fiscal position and the fiscal perception of native European citizens measured using ESS data. We find a conflicting relationship: countries where migrants are perceived negatively are instead countries where they are net fiscal contributors and *vice versa*.

Keywords: fiscal impact, immigration, quantile regression, European countries

JEL codes: H53, I30, F22

*Dept. of Economics and Management, University of Luxembourg, 6 Rue Richard Coudenhove-Kalergi, 1359 Luxembourg, email: majlinda.joxhe@uni.lu

†Dept. of Economics and Finance, University of Rome Tor Vergata, via Columbia, 2 – 00133, Rome, Italy; and School of Finance and Management, SOAS University of London, London, WC1H 0XG UK: email: ps6@soas.ac.uk

‡Dept. of Economics and Management, University of Luxembourg, 6 Rue Richard Coudenhove-Kalergi, 1359 Luxembourg, email: skerdilajda.zanaj@uni.lu

1 Introduction

In this paper, we examine the fiscal impact of immigrants in European countries by applying a quantile approach to the European Union Statistics on Income and Living Conditions (EU-SILC) data for the period 2007-2015. An increasing body of literature studies immigrants and their effect on the economy of the destination country. This interest does not come as a surprise. The share of foreign nationals in the European Union has been on the rise. In 2017, more than four million new immigrants entered at least one EU country (Eurostat, 2017). However, the stocks and the flows of immigrants are quite heterogeneous across EU countries. For instance, Germany reported the most significant total number of immigrants about (917,100) in 2017, followed by the United Kingdom (644,200), and Spain (532.100). This heterogeneity may lead to differences in the effects as well as in the perceptions that native citizens formulate about immigrants.

The fiscal impact of immigration has been at the forefront of the current political and public finance debate. In most, if not all, speeches and discourses of Brexit supporters have cited the fiscal impact of migrants on British public finances as the reason to leave the EU to impose more restrictive immigration policies on both EU and non-EU foreign nationals in the UK.

Migration economics has widely studied the impact of immigration on wages, employment, national savings, etc. (Card (2009), Ottaviano and Peri (2012), Arcangelis and Joxhe (2015)). Concern about the economic impact of migrants is strictly related to the feelings by native citizens about migrants (Card et al., 2012, and for a survey Preston, 2014). However, the effects of immigration on government public finance have attracted less attention. This is probably due to the complexity of the analysis and the varieties of methodologies proposed, which have produced contrasting results on whether migrants have positive or negative fiscal impacts in the destination country, Preston (2014). Besides, usually previous studies explore the fiscal effects in one destination country (Dustmann and Frattini (2014) for the UK, Martinsen and Rotger (2017) for Denmark, Clarke and Skuterud (2013), for Canada). The general takeaway in this literature is that the *average* fiscal position of migrants is not very different from that of natives. In addition, the effects of immigrants are relatively modest and in the range of 1 to 3 percent of GDP.

Prior cross country studies are very few: exceptions are Boeri (2010) and the OECD (2013). Boeri (2010) uses EU-SILC for the period 2004-2007 and finds that migrants are over-represented among beneficiaries of non-contributory transfers, and that they tend to receive more assignments than natives after accounting for their educational attainments and family characteristics. The OECD report finds that cross country comparisons also yield no significant differences between migrants and natives in fiscal terms. Both Boeri (2010) and the OECD (2013) use *average* comparisons of the fiscal positions of natives versus migrants.

The purpose of this research is to shed new light on the fiscal impact of immigrants in Europe, extending prior literature along several dimensions. Firstly, and differently from any previous paper, we use a quantile approach to detect differences in fiscal positions between migrants and natives belonging to the same income quantile. The quantile approach is quite a useful method to use in this setting because, as widely accepted, immigrants' income may lay replacedonin the tails of the income distribution, at least in the first years of arrival. Secondly, our exploration includes several destination countries in Europe, allow-

ing not only a pooled analysis at the European level but also comparisons across different EU countries and the UK. Finally, in this paper, we trace a subtle link between the fiscal impact of immigrants and the fiscal perception of native citizens concerning migrants.

At first, using the EU-SILC database, we calculate the fiscal position of migrants. We define an immigrant as a non-citizen in any given destination country. We can break down the origin of migrants only between EU and non-EU migrants. The net fiscal impact is the difference between annual fiscal contributions and fiscal transfers. Social transfers include Social assistance, Housing benefits, Sickness benefits, Unemployment benefits, and Education subsidies for groups at high risk of social exclusion. Taxes include the amount paid in income and wealth taxes, paid local fees, and finally pension contributions payments. We proceed firstly by estimating the fiscal position of migrants controlling for a series of individual characteristics such as gender, age, marital status, employment status, months spend in unemployment, education, and health status dummies. We also account for household observed characteristics like size, the degree of urbanization where the household lives, and a general poverty indicator for the family. The OLS results confirm the results already present in the literature. The fiscal position of both types of migrants, as compared to the fiscal position of natives, is positive but statistically insignificant. On average, migrants are not different from natives. Using a simple probit estimation, we look into the probability of migrants becoming fiscal contributors, and show that EU-migrants have a higher likelihood to become financial contributors compared to natives. In contrast, there is no difference between non-EU migrants and natives to become fiscal contributors.

We proceed with our empirical endeavor with the quantile regressions. Vulnerable groups are mostly located at the extremes of the statistical distribution of the income variable, rather than in the middle of the distribution. It appears, therefore, natural to examine fiscal positions using a quantile approach. The net fiscal contribution of migrants and natives is closely related to the income of the household and various other social and demographic factors. It is, therefore, crucial to examine the net fiscal position of migrants taking into account significant non-linearities in this relationship. We run quantile regressions for the 5th, 25th, 50th, 75th, and 95th quantile. The estimations show that in no country, EU-migrants belonging to the 5th quantile are fiscal dependent. Importantly, non-EU immigrants residing to the lowest of quantiles $Q_{0.05}$ are shown to be budgetary contributors in Europe paying €1300 more than native Europeans. Similarly, non-EU migrants belonging to the $Q_{0.95}$ pay €1613 more than natives in the same quantile. Looking at the country by country analysis, in no country migrants of the $Q_{0.05}$ are more fiscal dependent than natives. Again, contrary to the populist rhetoric, in the Netherlands and Belgium non-EU migrants pay respectively €8,517 and €9,628 more than native citizens of the same quantile.

Finally, we contrast the relationship between the calculated fiscal position of migrants for the 5th and 95th quantile of income with the fiscal perception of native citizens. In order to be as much accurate as possible, we refrain from making a comparison to the mean between natives and migrants for the following two reasons. First, due to selection biases as well as initial conditions, migrants may belong to the extreme quantiles of income. Second, it is reasonable to suspect that the fiscal perception of natives is mostly

driven by the most deprived groups of migrants who may benefit more from social services with the possible consequence of congesting these benefits for native citizens. To address this issue, we investigate the gap between fiscal position of migrants along different income quantiles and fiscal perception. For the perception, we refer to data from the most recently available wave of the European Social Survey 2014. A representative sample of the EU native population answered the question of whether migrants contribute or take away their services from the destination country. Surprisingly, the gap between the calculated fiscal implications and the fiscal perception of the native citizen in many European countries appears to be negatively correlated. In Denmark, Germany, Sweden, and Norway where natives show positive fiscal perceptions, both EU and non-EU migrants of the $Q_{0.05}$ or $Q_{0.95}$ are not significantly different than natives. In Belgium and Netherlands where the perception is negative, non-EU migrants belonging to $Q_{0.95}$ pay much more taxes than native citizens. In the other countries with negative perceptions (Hungary, Austria, Ireland, France, UK, Spain) migrants are no different than natives.

This negative correlation relates to the hypothesis pushed forward by Alesina, Miano, and Stantcheva (2018), who argue that the "distance" in terms of culture and genetics of migrants *v*s. natives is relevant in determining the perceptions towards immigrants. This hypothesis implies that in European destination countries, the presence of Asian and African origin migrants may explain the gap between perceptions and calculated fiscal position. Nonetheless, in our paper, the gap is true for EU migrants as well as non-EU migrants. It follows that beyond the hypothesis of Alesina et al. (2018), an additional mechanism can be in place, contrasting to a certain extent the effect push forward by Alesina et al. (2018). For instance, a long dated high number of non-EU migrants in a country may improve reciprocal knowledge between natives and migrants, improving inter-groups relations and thus affecting positively native's perception.

To conclude, we contend that an accurate understanding of the fiscal effects of immigration allows for more precise and fair comparisons of migrants with native citizens in terms of their fiscal contribution. Our new and important results are essential to inform the policy decision-making of the European Union as a whole and EU member states, ultimately allowing a proper design of immigration strategy and policy.

The paper is organized as follows. We continue in Section 1.1 with a review of the relevant prior literature. In Section 2 we provide the analysis of the fiscal position of migrants. Quantile regressions are introduced in Section 3. Section 4 is dedicated to the comparison of fiscal perceptions and net fiscal position. Finally, section 5 concludes.

1.1 Related literature

The literature on the fiscal effects of migrants is relatively sparse. Most prior studies analyze specific countries such as the US and the UK, with a smaller number concentrating on other countries such as Germany, Denmark, Canada, Australia, and New Zealand.

For the US, research has shown that welfare dependency in cash transfers is less likely for immigrants household than natives when taking into account essential personal characteristics, Blau (1984). Borjas and Trejo (1991) have documented that the probability of being a welfare user in the US increases with migra-

tion duration and with the more recent immigration inflows. Dustmann, Frattini, and Halls (2010) and Dustmann and Frattini (2014) show that EU migrants in the UK have made substantial financial contributions even during deficit years. Other migrants have been net fiscal beneficiaries – a contrast that is even stronger for migrants from the A8 countries that joined the union in 2004. A similar evaluation in Denmark also found robust and positive net contributions from EU migrants (Martinsen and Rotger (2017)).

Further, a static analysis of migration to Sweden from Bulgaria and Romania by Ruist (2014) found a net positive contribution of about €3,000 per person. Other studies show a more considerable welfare dependency among immigrants than natives, for example in Sweden and Finland, but this dependency decreases with their length of stay, Hansen and Lofstrom (2003), Sarvimäki (2011). Bratsberg, Raaum, and Red (2010) and Bratsberg, Raaum, and Red (2014) exploring the Norway case find that the social insurance dependency of immigrants declines over time. Cohen and Razin (2008) and Razin, Sadka, and Suwankiri (2011) claim that greater welfare generosity in a country may increase less-skilled immigrant flows when there are no policy controls, and argue that the latter can be a solution to welfare-driven immigration flows. De Giorgi and Pellizzari (2009), using data from the ECHP (European Community Household Panel) for the years 1994-2001, show that the influence of the welfare generosity is lower compared to the unemployment rate or wage levels. By contrast Boeri (2010), using data from EU-SILC for 2004-2007, finds that immigrants in Nordic countries are less likely to be net fiscal contributors, whereas in countries like Austria or Germany the opposite is true. On the other hand, Pedersen, Pytlikova, and Smith (2008) and Giulietti (2013) analyzing inter-country migration flows in panels of EU and OECD countries, suggest no firm evidence of welfare benefits for migrants.

There is furthermore growing public concern regarding the (ab)use of the welfare system by foreigners, which has to lead to cut-off welfare policies for non-natives in some European countries Boeri (2010). In this context, those who are concerned about immigration tend to highlight its negative implications, like welfare dependency among certain categories of immigrants, mainly those from poorer countries.

2 Net fiscal position of migrants in Europe

In this section, we detail how we measure the fiscal impact of immigrants in some European countries. We start by describing the data source and then we move to a more precise definition of our main dependent variable *i*.e. the net fiscal position in Section 2.2.

2.1 EU-SILC Database

The EU database on Statistics on Income and Living Conditions (EU-SILC), launched in 2003, is the first micro-level data set to provide comprehensive data on incomes and a large number of other social and economic domains, across all 27 member states of the enlarged EU. Information concerning the native citizens has a longitudinal dimension, which is lacking for the non-EU migrants. EU-SILC is the main data source for assessing the fiscal position of immigrants in Europe. It is a standardized annual survey

that contains information on a wide range of topics including individual and family background, house conditions, income, *e*tc. It also provides detailed information about the taxes paid as well as the social benefits received for all individual and their households, identifying in the meantime all the different sources of income.

EU-SILC provides a cross-section and a longitudinal dimension of data. Its longitudinal version would allow a dynamic micro-approach of the net fiscal position, but the non-identification of a non-EU citizens along the longitudinal dimension obliges us to use the cross-sectional version of the survey for the years 2007-2015.

Furthermore, the data files provided by EUROSTAT do not allow identifying the country of citizenship. We are able to recognize only if the individual is a native, a citizen of another EU country or a non-EU citizen. As a consequence, we can trace the origin of migrants only to whether they are EU citizens or not. In this perspective, we will explore the net fiscal position of migrants relative to natives citizens, who are always the reference category.

The sample of EU migrants is composed of 4.493 individuals, the non-EU migrants are 6.821 and the native citizens that will be the reference group in all our estimations include 128.114 individuals.

2.2 Summary Statistics

Table 1 presents summary statistics for our main variables. We classify the data based on three categories of interest, *i*.e., natives citizens, EU migrants and non-EU migrants. In table 1, data of EU countries are pooled together.

On average, immigrants are younger than natives while the gender composition is quite similar across the three categories. Natives show the lowest percentage of married individuals whereas non-EU migrants exhibit the highest number of married couples. Non-EU migrants spend more months in unemployment than EU migrants and natives. As far as education is concerned, a large share of EU-migrants (20%) have only primary education, whereas 13% of natives and 10% of non-EU migrants do so. A large percentage of natives posses upper secondary education (43%). Finally, more migrants exhibit tertiary schooling than natives.

Regarding self-employment and health status, the distribution of migrants at the European level does not differ from that of the native citizens. Most of the household characteristics are quite homogeneous across the three groups except for the poverty indicator that appears to be slightly larger for non-EU migrants.

Table 1: Summary Statistics: EU-SILC 2007-2015

	Natives		EU-Migrants		Non-EU-Migrants	
	Mean	SD	Mean	SD	Mean	SD
Individual						
Age	41.29	22.57	40.39	22.64	40.89	22.49
Male%	0.48	0.50	0.49	0.50	0.48	0.50
Marital Status	0.61	0.49	0.64	0.48	0.66	0.47
Unemployed %	0.09	0.28	0.11	0.31	0.14	0.35
No Qualification	0.01	0.90	0.01	0.09	0.02	0.12
Primary %	0.13	0.38	0.20	0.40	0.10	0.30
Lower Secondary%	0.17	0.41	0.14	0.34	0.20	0.40
Upper Secondary%	0.43	0.49	0.33	0.47	0.37	0.48
Post-Secondary%	0.04	0.17	0.03	0.17	0.04	0.18
Tertiary%	0.21	0.41	0.30	0.46	0.26	0.44
Health (Very Good) %	0.19	0.39	0.28	0.45	0.20	0.40
Health (Good) %	0.45	0.50	0.44	0.50	0.40	0.49
Health (Fair) %	0.25	0.43	0.18	0.38	0.27	0.44
Health (Bad) %	0.09	0.29	0.09	0.28	0.10	0.30
Health (Very Bad) %	0.02	0.15	0.02	0.13	0.03	0.16
Household						
Household Size	2.67	1.46	2.60	1.40	2.67	1.49
Household Degree of Urbanisation	1.98	0.89	1.98	0.87	1.96	0.88
Household Poverty Indicator	0.19	0.39	0.17	0.38	0.21	0.41
N	128114		4493		6821	

2.3 Net Fiscal Position

We calculate the net fiscal position of all the participants of the EU-SILC database for the period 2007-2015. This variable is defined as the difference between the total amount of taxes paid every year and the social transfers received. The tax variable includes social security contributions. More specifically, following EU-SILC methods, we include in taxes the amount paid in income and wealth taxes; paid local taxes and finally pension contributions payments. Social transfers encompass social assistance, housing benefits, sickness benefits, unemployment benefits, education subsidies for groups at high risk of social exclusion.

We proceed with a basic accounting calculation for each household in the panel by subtracting from the total amount of taxes paid the benefits received each year. Table 2 presents summary statistics of Net Fiscal Position (NFP) of natives, EU immigrants and Non-EU migrants, for the European countries pooled together. The average fiscal position for all the three categories is positively signed. Nonetheless, native citizens contribute €1189.53 to EU tax revenues, which is less than the contribution of migrants (EU migrants €1237.96 and non-EU €1217.69).

Table 2 reports the fiscal position of migrants and natives without taking into account the personal characteristics of individuals nor the distribution features of each type of population group. These raw numbers

Table 2: Net Fiscal Position (NFP) by country of birth- EU-SILC Database 2007-2015

	Mean	SD	Min	Max	No of Obs
NFP Natives	1189.53	9381.16	-194580.34	881184.25	128114
NFP EU Migrants	1237.96	9505.25	-63443.42	436711.88	4493
NFP Non-EU Migrants	1217.69	8410.03	-75055.88	139251.95	6821

Notes: EU-SILC 2007-2015 Pooled Panel for all European Countries Available

show a very similar mean and corresponding standard deviation. A more precise idea about the size and sign of fiscal position can be obtained by estimating the fiscal position while controlling for a series of exogenous individual and household characteristics.

In table 3, we include individual characteristics such as gender, age, marital and employment status, months spend in unemployment, education and health status dummies. We use also some household characteristics like the size, the degree of urbanization where the household lives and a general poverty indicator for the family. The full list is provided in Table 1. When including these controls, the fiscal position of both types of migrants, as compared to the fiscal position of natives, is positive but statistically insignificant. *On average, migrants are not different from natives.*

Table 3: Net Fiscal Position (NFP)

VARIABLES	(OLS) NFP	(OLS) NFP	(OLS) NFP
EU-Migrant	5.518	48.43	74.96
	(135.9))	(144.2)	(143.9)
Non-Eu Migrant	-4.300	28.16	84.17
	(96.63)	(105.1)	(104.0)
Individual and Household Controllers	No	Yes	Yes
Country FE	No	No	Yes
Constant	1,727***	1,190***	1,742***
	(187.8)	(26.21)	(230.0)
Observations	158,370	139,428	139,428
R-squared	0.019	0.019	0.017

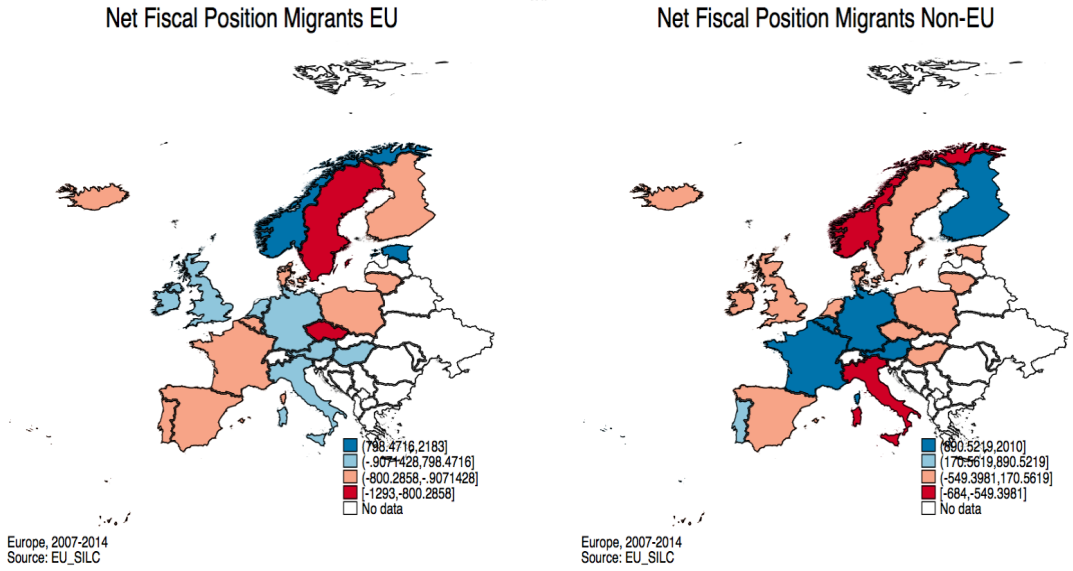
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

One simple yet informative estimation that hints to the future fiscal position of migrants is the probability of becoming fiscal contributor. For this measure, we use a probit estimation. Table 3 in column 4 shows that EU-migrants have a higher probability to become fiscal contributors compared to natives, whereas there is no difference between non-EU migrants and natives to become fiscal contributors.

We are now able to make a first exploration of the difference between natives' fiscal perceptions about migrants and the net fiscal position in Table 3. To facilitate such comparison, we represent the Net Fiscal position in Figure 1. We break down as previously, the average fiscal effect for EU and non-EU migrants. It is unclear how fiscal position of the average migrant is related to the stock of migrants or the perception of the natives. We believe that this relationship becomes clearer when we abandon the analysis on the average fiscal position and better explore how much taxes are paid and services are received from migrants belonging to different income quantiles. Before entering into the quantile regression approach of Section 4, we focus on Social Transfers and the possible heterogeneity of fiscal position of migrants and natives along the various components that build the Social Transfer variable.

Figure 1: Immigration Net Fiscal Position for Europe, EU-SILC 2007-2015

h



To better explore how migrants and native citizens benefit from social transfers, we run a few estimations disentangling the different items composing the social transfer variable. More precisely, we run separated estimations for the household allowances, cash transfers, child allowances, and finally the unemployment benefits. Results are shown in Table 4. Interestingly, as compared to natives, the EU migrants receive larger household and cash transfers, whereas non-EU migrants do not appear different from the natives. In addition, only EU migrants receive significantly more unemployment benefits than native citizens. As shown in Table 1, all migrants spend more time in unemployment, therefore it is not surprising that EU migrants receive more unemployment benefits. Furthermore, unemployment benefits are attributed once the individual has spent a certain period of time working. If we assume that for EU migrants it is easier to find a job in the EU market, then, the access to unemployment benefits for the EU-migrants it is easier than the access of non-EU migrants, who appear not to benefit from such benefits even though they are in

unemployment longer than the natives. EU migrants receive significantly more child allowances than natives. For the non-EU migrants this is exactly the opposite. They receive less child allowance than natives even though the size of the families, on average, is the same across the three categories of citizens.

Table 4: Social Transfers Allowances

VARIABLES	(1) Household	(2) Cash	(3) Child	(4) Unemployment
EU-Migrants	-1.287	76.14***	69.33**	225.6***
	(5.690)	(16.95)	(27.00)	(45.19)
Non-Eu Migrants	12.69**	8.608	-5.921	-42.21*
	(5.782)	(9.844)	(19.51)	(24.54)
Individual and Household Controllers	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Constant	101.5***	146.4***	-172.1***	160.3*
	(13.75)	(20.77)	(56.88)	(85.00)
Observations	139,417	139,320	139,428	104,739
R-squared	0.003	0.001	0.081	0.061

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

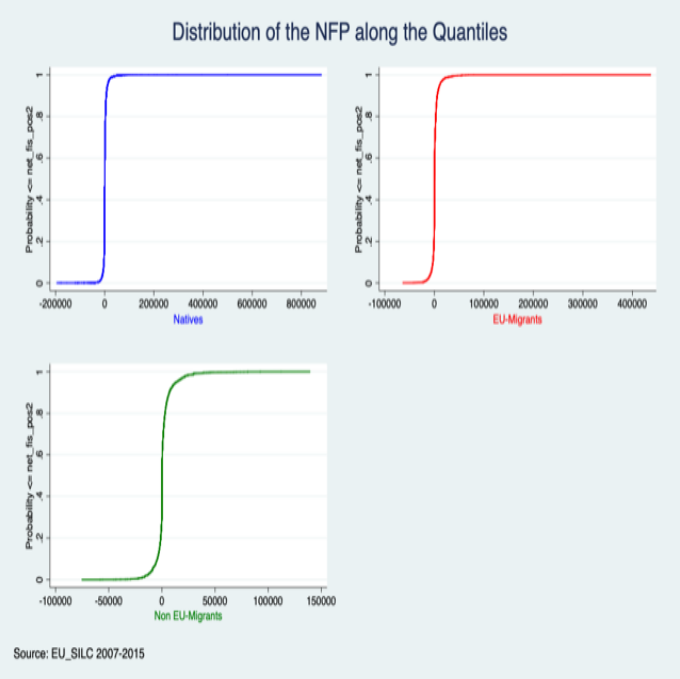
3 A quantile approach to fiscal position

A crucial aspect of the net fiscal contribution of migrants is that this is closely linked to the income of the migrant household and to other economic, social and demographic factors. It is therefore important to examine whether their net contribution varies with these factors, and in particular whether there are significant non-linearities in this relationship. Vulnerable groups are mostly located at the extremes of the statistical distribution of these variables, rather than in the middle of the distribution.

Quantile regression is a powerful statistical tool to explore non-linearities in the relationship between a set of regressors and the dependent variable (Koenker and Basset, 1978). Its main advantage over linear regression methods is that quantile regression can trace the entire distribution of the dependent variable conditional on a set of explanatory variables. This is especially relevant for the vulnerable groups in the tails of the distribution, which can exhibit a different sensitivity to the relevant factors than household in the middle of the distribution. Our sample contains large outliers and the distribution of the dependent variable is non-normal, as we can see from Figure 2 that represents the distribution of the NFP over the quantiles for the three groups (natives, non-EU migrants and EU migrants). It is therefore important to analyse possible non-linearities in the determinants of the fiscal position of migrants relative to the native population.

Figure 4 shows the net fiscal position of both natives and migrants. It is apparent that the tails of the distribution display a markedly different behaviour from the central quantiles. This warrants the use of a statistical methodology that allows for heterogeneity in the response by households at the extremes of the distribution.

Figure 2: Distribution of NFP over the quantiles



Quantile regression is applied to our panel dataset for the years 2007-2015. We estimate the following equation:

$$Quant_\theta(Y_{it} \mid x_{it}) = \alpha_\theta + x'_{it}\beta_\theta + \gamma_t + \delta_i + u_{\theta it} \tag{1}$$

where

$$Quant_\theta(u_{\theta it} \mid x_{it}) = 0 \tag{2}$$

Equation 1 is jointly estimated for the 5th, 25th, 50th, 75th and 95th percentiles of the NFP distribution, both for migrants from within the EU and for migrants from outside the EU. The same list of explanatory variables is included as conditioning variables for each of these quantiles. We also estimate equation 1 by OLS, in order to assess the average NFP for the different sub-groups. When we estimate the equation by OLS, we apply winsorisation at 1% and 99% in order to reduce the influence of potential outliers.

The estimations are run on the entire population of migrants and natives in Europe. The estimation results are reported in Table 5 and in Figures 5-7. The OLS regression in Table 5 does not find any significant effect on NFP for either EU-migrants and for non-EU migrants relative to natives, after controlling for individuals and household-specific variables. The quantile regressions, by contrast, offer a much more detailed breakdown of the results. The average NFP for each quantile is measured by the constant coefficient, which is increasing over the distribution because quantile regression sorts on average NFP. Thus, the

average NFP for the 5th quantile $Q_{0.05}$ is €-3,100, whereas the average NFP for the 95th quartile is positive and equal to about €13,000.

Table 5: Net Fiscal Position along the quantiales

	Winsor OLS	QR(05)	QR(0.25)	QR(0.5)	QR(0.75)	QR(0.95)
VARIABLES	NFP	NFP	NFP	NFP	NFP	NFP
EU-Migrant	-36.90	893.500*	2.564	-18.639	-31.578	-178.103
	(90.26)	(423.134)	(45.51)	(44.38)	(83.371)	(503.738)
Non-Eu Migrant	73.68	1300***	-7.416	-23.318	9.428	1613.658***
	(83.66)	(103.999)	(346.227)	(37.238)	(68.217)	(412.181)
Ind. and H. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1301***	-3100***	128.354	245.99*	1786.428***	13000***
	(190.7)	(98.781)	(105.63)	(102.822)	(193.505)	(1168.189)
Observations	139,428	139,428	139,428	139,428	139,428	139,428

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

An interesting result is that migrants in the lowest tail of the distribution contribute more than natives: the net additional contribution of EU migrants in the 5th quartile ($Q_{0.05}$) is about €900. There appears to be no significant difference between EU migrants and natives along the other quantiles of the distribution. On the other hand, non-EU migrants generate a positive contribution in the tails of the NFP distribution: both in the lowest quantile ($Q_{0.05}$) as well as in the highest one ($Q_{0.95}$), non-EU migrants contribute significantly more than native citizens. Their additional net contribution is about €1,300 for $Q_{0.05}$ and €1,600 for $Q_{0.95}$.

These are novel and important results. When we look at the whole distribution of NFP across the population, migrants from both within and outside the EU place a lower burden than the natives at low levels of NFP, whilst non-EU migrants contribute substantially more at high levels of NFP.

The estimated coefficients on individual regressors together with their confidence intervals are shown in Figures 5-7. The figures display the results from QR, alongside the coefficients from OLS estimation (these are the horizontal lines). Figure 5 shows the results for natives. Household size has a negative and significant coefficient for households on the left tail of the NFP distribution and a positive and significant coefficients for household on the right tail of the distribution; by contrast, OLS finds, on average, a small positive and significant effect from household size on NFP across the whole distribution. Marital status has a positive and significant effect both for households with low and with high NFP. Primary education has a negative and significant effect only for families with low NFP, whereas OLS finds a negative and significant coefficient throughout the distribution.The benchmark level education is no education at all. Lower secondary education would be negative and significant for low NFP households, in contrast to OLS estimates which find no significant effect.

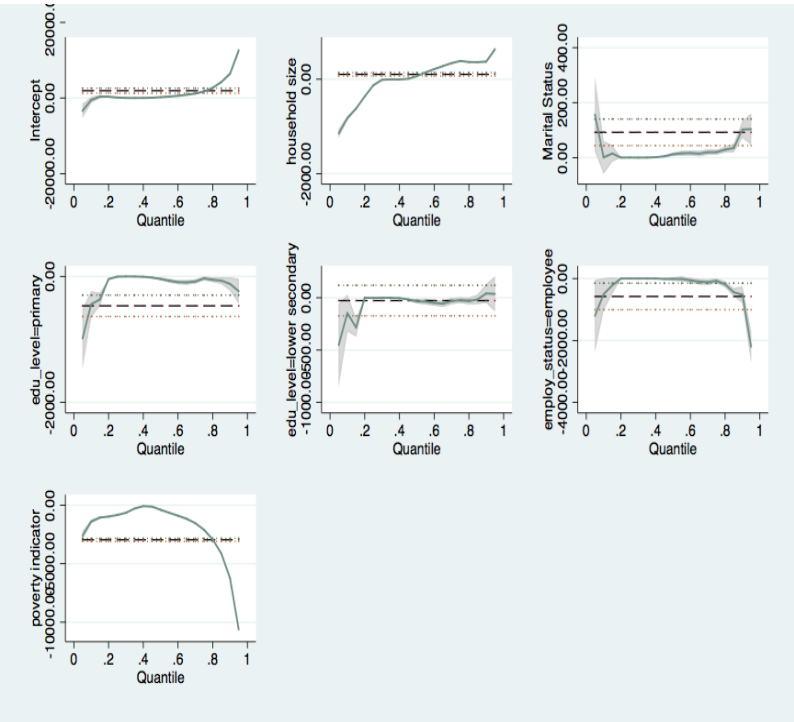


Figure 3: Quantile distribution of significant variables for Natives

The employment status is only significant at the extremes of the distribution, again in contrast to OLS which finds a negative effect on average for all households. The coefficients on poverty indicator are negative and significant, as in the OLS estimations, but display significant non-linearity and a well-defined inverted-U shape pattern. Figures 6 and 7 show the estimated coefficients and standard errors for EU migrants and non-EU migrants respectively, both for the quantile regressions and for OLS. We can see a number of notable differences in the effects of some variables relative to the population of natives. Primary education has a negative effect on net fiscal position at low levels of the distribution for natives, but not for migrants from either EU or non-EU countries. Marital status is only marginally significant for natives at the extremes of the distribution, but is highly positive and significant for non-EU migrants. The employment status has a strong negative effect at the negative and (especially) at the positive tail of the distribution for natives, but it has a negative effect for EU migrants at low quartiles of the distribution only, and is not significant for non-EU migrants.

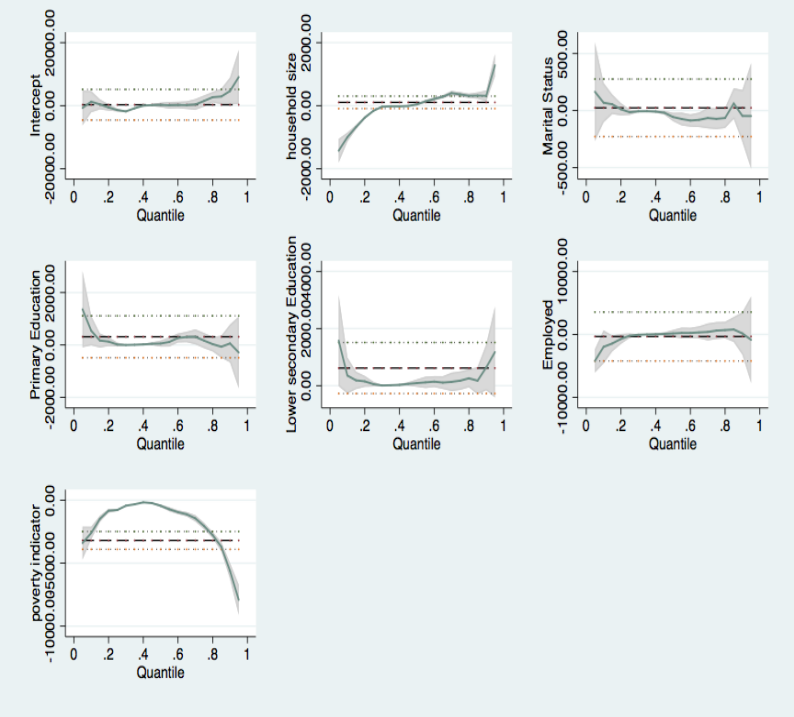


Figure 4: Quantile distribution of significant variables for EU migrants

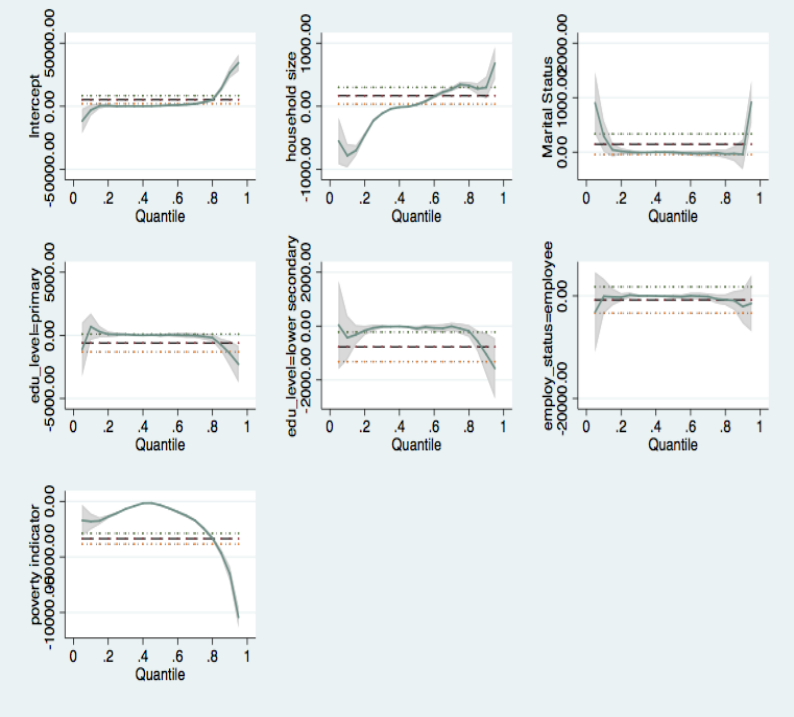


Figure 5: Quantile distribution of significant variables for Non-EU migrants

These results show that the net fiscal position of households is a strongly non-linear function of many of its key determinants, and that some effects are different for migrants than for natives. There are however some common aspects: in particular, the effect of household size turns from negative to positive as we move up the quantiles of the distribution.

4 Perception of Fiscal Impact in Europe

Public opinion on immigration is a crucial aspect of the current debate on migration. How natives perceive migrants may affect immigration policies as well as the integration of immigrants in the host country (Preston, 2014). It is hard to believe that native citizens have accurate knowledge about the fiscal impact of immigrants. Still, it remains interesting to investigate how much the perception aligns with the actual statistics on the fiscal position of immigrants and how country variation there is in such a (mis)alignment. Opinions and often hostility against migrants are influenced by political rhetoric, which in turn, in a circular argument, may affect the voting decision and thus politics (Benhabib (1996) and Dolmas and Huffman (2003)). In many European countries, parties at the edges of the political spectrum (particularly on the right) are securing an increasing number of seats. This is the case both in national parliaments and—especially—in the Brussels-based European Parliament, where there has been a low voter turnout that has particularly benefited more extreme party platforms. Far-right and nationalist political parties, in particular, have successfully capitalized on concerns about immigration. In France, the far-right National Front, led by Marine Le Pen, unexpectedly took 25% of the vote in the 2014 European Parliament elections with a campaign that mainly fought against migrants. In the UK's Brexit referendum campaign, UK politicians primarily argued about the negative impact of migrants on the national welfare state. In the presidential elections in Austria in 2016, a representative of the far-right, the Freedom Party of Austria's almost won the vote against the independent ecologist candidate, with similar anti-immigrants arguments. The European elections in 2019, marked the Lega movement in Italy as the most massive political winner of these polls. On January 31st, 2020, the UK left the European Union with the argument of being more "protected" towards migrants from EU and non-EU countries.

To explore the perception of immigrants in European countries, we refer to data from the most recent available wave of the European Social Survey 2014.[1] The new module of this survey includes a series of questions aimed at measuring the perception of native European citizens about the impact of immigration on their country. Interestingly for our study, a more specific question is made concerning the perception of the fiscal impact of migrants in EU countries. We call this *fiscal perception*. The question of the survey is as follows:

> "Do you believe immigrants are taking more in service than what they are contributing to taxes?"

The answer is built as an ordinal variable where the answer zero means immigrants are perceived to take

[1] More information on the database can be found at https://www.europeansocialsurvey.org

more in services than pay in taxes, and ten means immigrants are believed to pay more taxes than they receive in services. For the year 2014, the average responses are clustered around the average of 5, showing that for Europeans migrants, neither contribute nor depend on fiscal terms. However, looking more closely at the distribution, we find that around 39 % of answers claim immigrants are fiscal dependent, whereas only 30 % of the answers say immigrants are fiscal contributors. Moreover, fiscal perception towards immigration varies considerably across countries, as evidenced in Figure 6, where different colors capture fiscal perception. Austria, France, Hungary, Ireland, Spain, Czech Republic and the UK are countries with a negative fiscal perception (*i*.e., natives in these countries claim that immigrants receive more services than pay taxes). By contrast, in Denmark, Island, Germany, Norway, Poland, and Sweden, the perception of migrant's fiscal position results to be positive, implying that natives believe that immigrants pay more taxes than they receive benefits. Figure 6 also shows the distribution of answers by European natives related to the overall immigration perception question measured by the answers to the question

"'Is immigration bad or good for the country's economy?"'

35 % of the answers state that immigration is bad for the economy, whereas 41% of the answers claim that immigration is good for the economy. It appears that negative perception about the fiscal position is more spread than the overall negative perception.

From a temporal perspective, it is interesting to notice that most countries' fiscal perception has become more positive over the period 2002-2014. [2] Only in a few cases, such as Austria, Spain, and Portugal, the change in perception reveals a polarization of native populations towards migrants' fiscal position during the period 2002-2014. Importantly, the polarization in these countries has occurred before the European Refugees Crisis of 2015. In Ireland, Sweden, and Norway, the perception has moved from being on average negative in 2002 to being on average positive in 2014.

Another aspect that must be taken into account when analyzing perceptions is the stock of migrants in the country. We argue that a high number of migrants may create congestion on the social services of the host economy and affect perception. Furthermore, depending on the origin of the migrants, non-EU versus EU, as argued by Alesina *e*t al. 2018, the opinion of natives can vary because perceptions may depend on the cultural distance between natives and migrants. Figure 7 shows the overall stock of migrants in the period 2007-2015 for both categories. EU-migrants populate more Spain, Italy, and Poland whereas non-EU migrants are more concentrated in Italy, Spain and Germany. Due to the peninsula geographical position of Italy and Spain and proximity to the North Africa coasts, the crossing of the Mediterranean Sea has historically been the most used route for non-EU migrants. Poland, on the other hand, is the easiest and closest destination for east European citizens. A look at the perceptions and stocks leads to ambiguous conclusions that need further explorations. Non-EU migrants populate Italy, Spain, and Poland, but none of these countries has negative perceptions about the fiscal position of migrants. EU migrants are mainly living in Spain, France, Germany, and Finland, where the opinion is slightly negative. Finally, Austria, Hungary, and the Czech Republic show exhibit a very negative perception while having reduced migrants

[2] This information retrieves from the ESS data of 2002 and 2014 about the perception of the fiscal position of migrants.

stocks.

Figure 6: Immigration Fiscal Perception Europe, ESS 2014

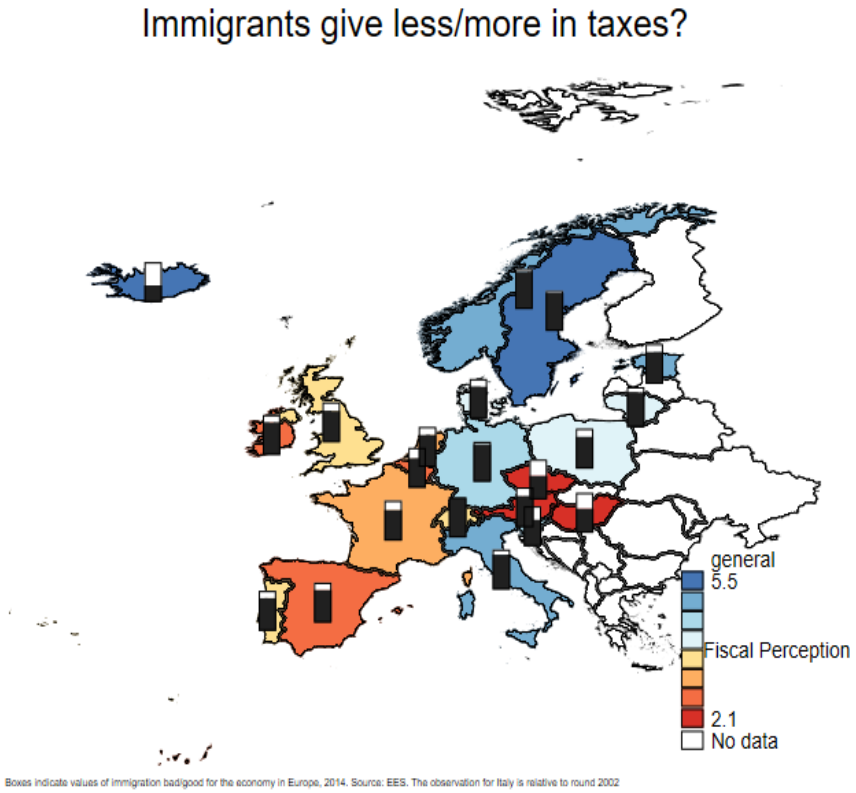
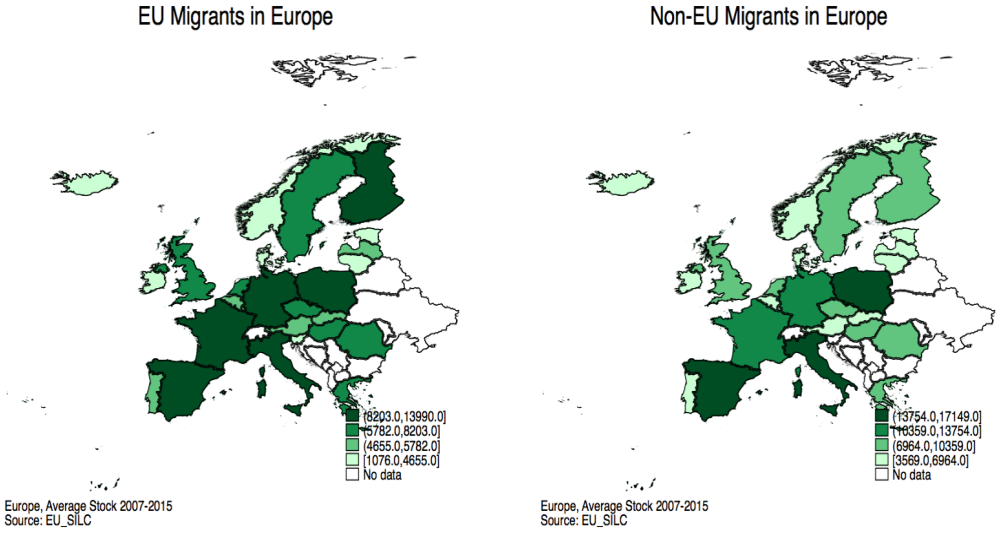


Figure 7: EU-Migrants 2007-2015



At this point, we can make a link between fiscal perception net fiscal position of migrants. To be as accurate as possible, we would like to avoid to make comparison to the mean between natives and migrants, because one can argue that perception may be created by the poorest groups of migrants who may possibly benefit more on social services to the cost of congesting these benefits for native citizens.

The results across quantiles in Table 5 are run at the European level, hiding countries specificity. In order to address this issue we also ran the same estimations for $Q_{0.05}$ and for $Q_{0.95}$ for each country in our sample. The coefficients are reported in Tables 6 and 7. Table 6 presents the net fiscal position of migrants in Denmark, Germany, Poland, Lithuania, Estonia, Portugal, Sweden, Norway and Island. All these countries share the feature that their natives show a positive fiscal perception in the ESS 2014 wave. As we observe, none of the coefficients of the calculated fiscal position is statistically significant. The poorest group of migrants and the richest one do not present significant differences with respect to natives of the same income quantiles. The positive fiscal perception of natives is a sign of optimism or a feeling of welcoming with respect to migrants.

Table 6: NFP in Quantiles in countries with positive fiscal perception

Country	(1) EU-Migrants		(2) Non-EU Migrants	
	NFP ($Q_{0.05}$)	NFP ($Q_{0.95}$)	NFP ($Q_{0.05}$)	NFP ($Q_{0.95}$)
Denmark	-579	-763	-531	1813
Germany	2318	2486	-1300	-255
Poland	443	-590	-1800	50
Lithuania	2150	846	-3200	-65
Estonia	-579	411	-531	2073
Portugal	-1400	-1700	40	-948
Sweden	-951	132	-1300	611
Norway	-5300	-1200	1921	111
Island	1018.5	798	-2000	835

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Instead, Table 7 includes countries where native citizens show a negative fiscal perception in the 2014 wave of the ESS. In Hungary, Austria, Belgium, Netherlands, Ireland, France, UK and Spain, the calculated fiscal position of migrants is not statistically different from natives in each country. This holds for every quantile of the distribution. Such a result shows that there is a spread misperception about the fiscal contribution of migrants. The source of this misperception cannot be identified in our database but it is worth to investigate in future work.

There is one notable exception in Table 7. Non-EU migrants belonging to the lowest quantile in Czech Republic obtain 5700 euros more in social services than they pay in taxes, as compared to the natives. But in Belgium and the Netherlands, migrants of highest quantile are more fiscal contributors than natives of 9628 euros and 8517 euros, respectively. To investigate further the case of Czech Republic we run the same estimations but excluding the years 2014-2015. When we consider the period of time from 2007 to 2013, we find no statistical significant effect for Czech Republic either. This seems to suggest that the effect is partly

Table 7: NFP in Quantiles in countries with positive fiscal perception

Country	(1) EU-Migrants		(2) Non-EU Migrants	
	NFP ($Q_{0.05}$)	NFP ($Q_{0.95}$)	NFP ($Q_{0.05}$)	NFP ($Q_{0.95}$)
Hungary	254	4122	553	-893
Czech Republic	682	-145	-5700**	2626
Austria	673	-276	2125	1012
Belgium	-318	-1300	686	9628***
Netherlands	-1700	-132	-1800	8517***
Ireland	2390	-1500	-2700	-953
France	-808	-56	-563	-809
UK	-276	-58	1012	4530
Spain	1378	141	-562	102

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

due to the presence of some refugees that started to flow into Europe already in 2014.

5 Conclusions

Knowledge of the net fiscal effects of migration is important not only for researchers but also for policy makers. The balance of payments and receipts of migrants reveals whether migration and ultimately immigration policies produce economics benefits or costs for the destination countries.

Our paper sheds light on the fiscal position of migrants in EU countries and offers some evidence on the economic impact of migration that can inform policy making. We find that in no income quantile and in no EU country under investigation, migrants are more fiscal dependent that natives. Objections to the perceived burden placed by immigrants on public finances that motivates much popular opposition to immigration appear to be unsupported by data. Quite the contrary in Europe, in Belgium and in the Netherlands in particular, immigrants belonging to the 95th quantile have a net positive fiscal position which shows they are contributing more to the public finance of destination countries than the native citizens. Our analysis also highlights important differences between EU and non-EU migrants. The EU migrants benefit sensibly more than native citizens as far as it concerns Cash, Child and Unemployment benefits; whereas non-EU migrants only receive €12.69 more than native citizens in Household transfers.

To conclude, we believe that to further improve the chances that the net fiscal effects of migrants is positive, policy decisions should focus on a clear-sighted labor migration strategy that facilitates migrants integration, rather than focus on fiscal dependency of migrants in Europe.

It goes without saying that immigration flows do not have only economic implications. They affect social cohesion and political preferences of native Europeans. It is then crucial to carefully and fairly identify their economic impact that affects hostility *vs.* hospitality feelings of EU citizens.

References

Alesina, A., Miano, A., & Stantcheva, S. (2018, June). Immigration and redistribution [Working Paper]. (24733). Retrieved from http://www.nber.org/papers/w24733 doi: 10.3386/w24733

Arcangelis, G. D., & Joxhe, M. (2015, December). How do migrants save? Evidence from the British Household Panel Survey on temporary and permanent migrants versus natives. *IZA Journal of Migration*, *4*(1), 1-23. doi: 10.1186/s40176-015-0034-y

Blau, F. D. (1984, January). The Use of Transfer Payments by Immigrants. *ILR Review*, *37*(2), 222-239.

Boeri, T. (2010, October). Immigration to the Land of Redistribution. *Economica*, *77*(308), 651-687.

Borjas, G. J., & Trejo, S. J. (1991, January). Immigrant Participation in the Welfare System. *ILR Review*, *44*(2), 195-211.

Bratsberg, B., Raaum, O., & Red, K. (2010, 07). When Minority Labor Migrants Meet the Welfare State. *Journal of Labor Economics*, *28*(3), 633-676.

Bratsberg, B., Raaum, O., & Red, K. (2014, November). Immigrants, Labour Market Performance and Social Insurance. *Economic Journal*, *124*(580), 644-683.

Card, D. (2009, May). Immigration and Inequality. *American Economic Review*, *99*(2), 1-21.

Clarke, A., & Skuterud, M. (2013). Why do immigrant workers in australia perform better than those in canada? is it the immigrants or their labour markets? *Canadian Journal of Economics*.

Cohen, A., & Razin, A. (2008, November). *The Skill Composition of Immigrants and the Generosity of the Welfare State: Free vs. Policy-Controlled Migration* (CEPR Discussion Papers No. 7034). C.E.P.R. Discussion Papers.

De Giorgi, G., & Pellizzari, M. (2009, August). Welfare migration in Europe. *Labour Economics*, *16*(4), 353-363.

Dustmann, C., & Frattini, T. (2014, November). The Fiscal Effects of Immigration to the UK. *Economic Journal*, *124*(580), 593-643.

Dustmann, C., Frattini, T., & Halls, C. (2010, 03). Assessing the Fiscal Costs and Benefits of A8 Migration to the UK. *Fiscal Studies*, *31*(1), 1-41.

Giulietti, C. (2013, March). Unemployment benefits and immigration: evidence from the EU. *International Journal of Manpower*, *34*(1), 24-38.

Hansen, J., & Lofstrom, M. (2003). Immigrant Assimilation and Welfare Participation Do Immigrants Assimilate Into or Out of Welfare? *Journal of Human Resources*, *38*(1).

Martinsen, D. S., & Rotger, G. P. (2017, December). The fiscal impact of EU immigration on the tax-financed welfare state: Testing the ?welfare burden? thesis. *European Union Politics*, *18*(4), 620-639.

OECD. (2013, June). International Migration Outlook. *European Union Politics*. doi: https://doi.org/10.1787/migr_outlook-2013-en

Ottaviano, G. I. P., & Peri, G. (2012, 02). Rethinking The Effect Of Immigration On Wages. *Journal of the European Economic Association*, *10*(1), 152-197. doi: j.1542-4774.2011.01052.x

Pedersen, P. J., Pytlikova, M., & Smith, N. (2008, October). Selection and network effects–Migration flows

into OECD countries 1990-2000. *European Economic Review*, *52*(7), 1160-1186.

Preston, I. (2014, November). The Effect of Immigration on Public Finances. *Economic Journal*, *124*(580), 569-592.

Razin, A., Sadka, E., & Suwankiri, B. (2011). *Migration and the Welfare State: Political-Economy Policy Formation* (Vol. 1) (No. 0262016109). The MIT Press.

Ruist, J. (2014). Free immigration and welfare access: The swedish experience. *Fiscal Studies*, *35*(1), 19-39. Retrieved from `https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1475-5890.2014.12021.x` doi: 10.1111/j.1475-5890.2014.12021.x

Sarvimäki, M. (2011). Assimilation to a welfare state: Labor market performance and use of social benefits by immigrants to finland. *The Scandinavian Journal of Economics*, *113*(3), 665–688.

Supplementary Material for **"FISCAL EFFECTS OF IMMIGRATION IN EUROPE: A QUANTILE REGRESSION APPROACH"**

A EU-SILC Database and Variables definition

EU-SILC (Community Statistics on Income and Living Conditions) is a survey that is produce at collecting timely and comparable cross sectional and longitudinal multidimensional micro data on income poverty and social exclusion in Europe. This instrument is anchored in the European Statistical System (ESS). EU-SILC was launched in 2004 in 13 MS (all except NL, DE, UK and the 10 new MS except EE) + NO and IS. The instrument aims to provide two types of data: (i) Cross-sectional data pertaining to a given time or a certain time period with variables on income, poverty, social exclusion and other living conditions, and (ii) Longitudinal data pertaining to individual-level changes over time, observed periodically over, typically, a four years period.

According to the Commission Regulation on sampling and tracing rules (N82/2003 of 21 October 2003), the sample selection has to fulfil the following requirements:

(i)For all components of EU-SILC (whether survey or register based), the cross-sectional and longitudinal (initial sample) data shall be based on a nationally representative probability sample of the population residing in private households within the country, irrespective of language, nationality or legal residence status. All private households and all persons aged 16 and over within the household are eligible for the operation.

(ii)Representative probability samples shall be achieved both for households, which form the basic units of sampling, data collection and data analysis, and for individual persons in the target population.

(iii)The sampling frame and methods of sample selection shall ensure that every individual and household in the target population is assigned a known and non-zero probability of selection.

Besides, the EU-SILC Framework Regulation (N77/2003 of 16 June 2003) sets out minimum effective sample sizes which shall be achieved by the countries both for the cross-sectional and the longitudinal components. The cross-sectional sample sizes were calculated in order to achieve an effective size of 121.000 households at the European level (127.000 including Iceland and Norway). Then, the allocation among the countries aims to ensure a minimum precision for each of them. The longitudinal sample sizes refer, for any pair of consecutive years, to the number of households successfully interviewed in the first year in which all or at least a majority of the household members aged 16 or over are successfully interviewed in both the years.

Table 8: Variable Description: EU-SILC 2007-2015

Variables	Categories	Description
Net Fiscal Position	Continues	Variable constructed based on: Difference between Taxes and Social benefits within the house for one year
Taxes		**Tax on Income**; **Local Taxes**; **Pension Contribution**
Social Transfers		**Social assistance**; **Housing benefits**; **Sickness benefits** **Unemployment Benefits**; **Education Allowances**; **Public Health Service** **Disability allowances**; **Family related allowances**; **Subsidies for marginal groups**
Countries Included	Binary	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Hungary, Ireland, Iceland, Italy, Lithuania, Luxembourg, Latvia, Netherland, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, United Kingdom
Individual Level		
Socio-Demographic Controls		
Age	Continuous	Age for the whole Sample : 18- Years
Male	Binary	Dummy variable: 1=Male; 0=Female
Married	Binary	Dummy variable:1=Married or living in couple; 0=otherwise
Education Level	Binary	Dummy variables for: No Qualification, Primary, Lower Secondary, Upper Secondary, Post-Secondary, Tertiary
Unemployed	Binary	Dummy Variable: 1=Unemployed, 0=Otherwise
Health Status	Binary	Dummy variables for: Very Good, Good, Fair, Bad and Very Bad
Household Level		
Household Size	Discrete	Number of People in the Household [1-10]
Degree of Urbanization	Continues	
Poverty Indicator	Binary	